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EXAMINER

CHEN, TIANJIE

ART UNIT	PAPER NUMBER
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2652

DATE MAILED: 06/21/2004

18

Please find below and/or attached an Office communication concerning this application or proceeding.

13

Office Action Summary

Application No.

09/830,928

Applicant(s)

SHIMAZAKI ET AL.

Examiner

Tianjie Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 51-94 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 88-94 is/are allowed.
- 6) ☒ Claim(s) 51-87 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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2nd non-Final Rejection

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claim 67 is rejected under 35 U.S.C. 102(b) as being anticipated by Akiyama et al (JP 10-81964).

With regard to claim 67, Akiyama et al shows a disk substrate for an optical disk in Table I, the substrate having an axis of rotation and a thickness of less than 0.8 mm, wherein a disk plane tilts at a tilt angle θ , which satisfies:

$$10 \text{ mrad} \leq \theta \leq 20 \text{ mrad},$$

with a plane perpendicular to the axis of rotation (English translation, [0015] line 7).

2. Claims 58, 66, 76, 77, 80, and 86 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki (US 5,058,094).

With regard to claims 58 and 66; Suzuki shows a disk D with substrate in Figs. 5A and 5B for an optical disk (Column 1, lines 5-10) which is to be mounted on a magnetic mounting part 5+6 of a driving apparatus for driving the optical disk including: and a hub 1 which is attractable by the magnetic part 6 to press the optical disk from Fig. 5A in such manner that the disk plane becomes horizontal in Fig. 5B when the disk is mounted on the mounting part of the driving apparatus.

With regard to claim 76, Suzuki shows a driving apparatus or driving a record disk having a tilt (Fig. 5A) and a hub 1 (Fig. 5A; column 1, line 39) which is magnetically attracted (Column 1, lines 39-41) to press the record disk, including: a driving unit M (Fig. 4A); and a support (the top surface of 5) for supporting a part of the record disk to adjust the tilt of the disk (Fig. 5B).

With regard to claim 77, Suzuki further shows an axis of rotation and a disk plane substantially tilting with respect to a plane perpendicular to the axis of rotation (Fig. 5A).

With regard to claim 80, Suzuki further shows the driving unit has a rotating shaft for rotating the record disk, and the support is formed at the top of the shaft (Fig. 5B).

With regard to claim 86, Suzuki further shows the rotating shaft includes a magnet 6 fitted therein for attracting the hub.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 51, 54, and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokota (US 5,987,003) in view of Takahashi et al (US 5,323,381).

With regard to claims 51 and 56, Yokota shows an optical disk (Column 1, lines 6-8) in Fig. 2 for recording information thereon and reproducing the information

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therefrom, including a disk substrate A1 having a hole 4 formed through the center thereof; a recording layer 2 (Column 2, line 61), which is formed on the substrate and on which the information is recorded; a recessed area 3, which has an area up to 30% of the total area of the disk substrate (Column 4, lines 58-60).

Yokota does not show a hub provided on the center of the substrate so as to be movable relative to the substrate; the hub having a diameter which is 26% or more than that of the optical disk; the optical disk satisfies a relationship of $Y/X \geq 0.015$ /(claim 51) or 0.02 (Claim 56), where X is a projected area of the substrate and Y is a contact area between the hub and the substrate.

Takahashi et al shows an optical disk (Column 1, lines 8-9) being housed rotatably in a cartridge case (Column 3, lines 14-15), having a hub 35 provided on the center of the substrate in a recessed portion so as to be movable (Figs. 14-17; column 9, lines 36-38) relative to the substrate.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply hub taught by Takahashi et al into Yokota's device. The rationale is as follows: Yokota teaches that a disk with a recess and his substrate is for mounted on hub (Column 2, lines 2-3) but does not specify the hub. Takahashi et al teaches a disk with a hub in a recess and the structure would prevent deterioration of optical properties and be free from double refraction or the like defects (Column 3, lines 26-30). One of ordinary skill in the art would have been motivated to apply the hub taught by Takahashi et al thus improving optical property of the disk. In such constructed device, the area of the of the hub reaches 30% of the projected area, thus the hub would have a diameter which is more than 26% of that of the optical disk. Furthermore, since the area of the hub $S = 0.30 X$, and Figs 14-17 shows

that the contact area $Y > 0.05/0.07$ S. Therefore, the optical disk satisfies a relationship of $Y/X \geq 0.015/(\text{claim 51})$ or 0.02 (Claim 56).

With regard to claim 54, Takahashi et al shows that the hub 35 having a convex center portion with a side wall, the side wall having a sloping at an angle between 130 and 160 degrees at half the height of the hub.

4. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokota in view of Takahashi et al as applied to claim 51 further in view of Abiko (JP 06-111518A).

With regard to claim 52, Takahashi et al show the disk is used in a cartridge, but fails to show the cartridge.

Abiko shows a disc cartridge case in Fig. 4, which defines a space therein, and a size of the width of the space is 300 or more % of a thickness of the substrate.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply the cartridge hub taught by Abiko into Yokota and Takahashi et al's device. The rationale is as follows: Takahashi et al teaches the disk is used with a cartridge, but does not show the cartridge. One of ordinary skill in the art would have been looking for a cartridge for his disk. Abiko shows a cartridge, which used with a disk having pretty much same structure as Takahashi et al's structure. One of ordinary skill in the art would have been motivated to apply the hub taught by Takahashi et al thus improving optical property of the disk.

5. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokota, Takahashi et al, and Abiko, and further in view of Tanaka (US 6,014,365).

With regard to claim 53, Abiko shows an optical disk as described above, but fails to show that the cartridge case has a recess and a protrusion formed on the inner surfaces thereof which face the disk, and the recess and protrusion adjust airflow in the cartridge case while the disk is rotating and are arranged to diverge away from the center of the disk at angle between 5 and 90 degrees.

Tanaka shows a cartridge case in Fig. 3, having a recess and a protrusion 15a formed on the inner surfaces thereof, which face the disk, and are arranged to diverge away from the center of the disk at angle between 5 and 90 degrees.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to add the recesses and protrusions taught by Tanaka into the above device. The rationale is as follows: Tanaka teaches that by adding the protrusion, the disk is contained in the disk storing portion, with only the peripheral edges supported and in contact with the inner surface of the cartridge body when the disk passes through the disk inlet/outlet port (Column 6, lines 23-27). One of ordinary skill in the art would have been motivated to include the protrusions to protect the disk.

6. Claim 55 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokota and Takahashi et al as applied to claim 51 above, and Suzuki applied to claim 58 further in view of Yoo et al (US 6,222,812).

With regard to claim 55, Yokota and Takahashi et al do not show the optical disk having a thickness of 0.7 mm/0.8 mm or less.

Yoo et al shows a DVD disc wherein the substrate has a thickness of 0.6 mm, which is less than 0.7 mm/0.8 mm.

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It would have been obvious at the time the invention was made to one of ordinary skill in the art to expect set the thickness being 0.6 mm. The rationale is as follows: Yokota discloses an optical disc, but it is an old invention. At the time the invention was made both 1.2 mm and 0.6 mm are standard thickness in industry. One of ordinary skill in the art would have been motivated to include 0.6 mm as the thickness to make the disk being able to use for the apparatus in the market.

7. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokota and Takahashi et al, as applied to claim 56 above, and further in view of Tsai (US 6,266,298).

With regard to claim 57, Yokota shows the optical disk is used in optical disk (Column 1, lines 6-8); but does not specify the speed.

Tsai shows an optical disk apparatus, wherein the disk is an apparatus, which uses optical disk and rotates at a speed of 2,400 or more rpm for recordation and reproduction (Column 2, line 37-39).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to set the speed at 2400 rpm or more as taught by Tsai. The rationale is as follows: Yokota teaches that the disk is used for an optical disk. Tsai shows the optical disk is commonly operated at a speed more than 2400 rpm (Column 2, lines 37-39). One of ordinary skill in the art would have been motivated to set the speed at 2400 rpm or more to operate the disk at high speed.

8. Claims 60, 61, 62, 79, and 81-85 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki further in view of Takahashi et al (US 5,323,381).

With regard to claims 60 and 79, Suzuki does not show that the record disk having an axis of rotation and a cylindrical receptacle for holding the hub, the receptacle having a hole formed through the bottom thereof coaxially with the axis of rotation.

Takahashi et al shows a record disk in Fig. 14 having an axis of rotation and a cylindrical receptacle for holding the hub, the receptacle having a hole formed through the bottom thereof coaxially with the axis of rotation.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply hub taught by Takahashi et al into Suzuki's 's device. The rationale is as follows: Takahashi et al teaches a disk with a hub in a recess and the structure would prevent deterioration of optical properties and be free from double refraction or the like defects (Column 3, lines 26-30). One of ordinary skill in the art would have been motivated to apply the hub taught by Takahashi et al thus improving optical property of the disk.

With regard to claim 61, Suzuki's device includes an axis of rotation and a disk plane substantially tilting with respect to a plane perpendicular to the axis of rotation; the record disk has an axis of rotation, and a disk plane tilting at a tilt angle with a plane perpendicular to the axis of rotation, the tilt angle θ varies from Fig. 5A to 5B, which must have a point, at this point the tilt angle θ satisfies the relationship of $1 \text{ mrad} \leq \theta \leq 20 \text{ mrad}$.

With regard to claim 62, Takahashi et al further shows that the hub is held movably in the cylindrical receptacle (Column 9, lines 37-38).

With regard to claim 81, Suzuki shows that the driving unit has a rotating shaft for rotating the record disk, the rotating shaft has a cylindrical recess formed coaxially

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in the top thereof for holding the cylindrical receptacle, the rotating shaft also has a side wall defining the recess, and the support is formed at the top of the side wall.

With regard to claim 82, Suzuki further shows in Fig. 5B that the rotating shaft 4+5 protrudes axially from the bottom of the cylindrical recess, and the shaft includes: a first columnar protrusion having an outer diameter larger than that of the hole in the bottom of the record disk; and a second columnar protrusion protruding coaxially from the first protrusion axially of the rotating shaft.

With regard to claim 83, Suzuki further shows the disk plane tilts at an angle θ with a direction perpendicular to the axis of rotation away from the bottom of the cylindrical receptacle, and the angle changes from Fig. 5A to Fig. 5b, which includes a point, at that point the angle θ satisfies a relationship of $1 \text{ mrad} \leq \theta \leq 10 \text{ mrad}$.

With regard to claim 84, Suzuki further shows that the top of the cylindrical wall defining the recess of the rotating shaft extends radially outward.

With regard to claim 85, Suzuki further shows in Fig. 5B that when the record disk is mounted on the driving apparatus, the hole of the disk engages with the second protrusion to support the disk plane of the disk on top of the horizontal support, whereby the disk plane is kept at an angle of 10 or less mrad with a plane perpendicular to the axis of rotation of the disk as explained above.

9. Claims 64 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Yokota and Takahashi et al.

Suzuki shows an apparatus using an optical disk but does not show the details of the disk. As described above, the Yokota and Takahashi et al's disk is an optical disk, which can be used for Suzuki's device. This disk has a relationship of

$Y/X \geq 0.015$ is satisfied, where X and Y respectively denote the projected area of the substrate and the contact area between the hub and the substrate; an outer diameter that is 26 or more % of the outer diameter of the substrate for the reasons described above.

10. Claims 68/67, 69/67, 70, 72, and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandstrom et al (US 6,154,411) in view of Akiyama et al (JP 10-81964).

With regard to claims 68/67 and 75; Sandstrom et al shows a disk substrate in Fig. 2 for an optical disk 36 which is to be mounted on a magnetic mounting part 30 of a driving apparatus for driving the optical disk including: and a hub 44 which is attractable by the magnetic part 58 (Column 11, lines 64-66) to press the optical disk in such manner that the disk plane becomes horizontal when the disk is mounted on the mounting part of the driving apparatus and the hub can be magnetically attracted.

Sandstrom et al does not explicitly show a disk plane tilting substantially with respect to a plane perpendicular to an axis of rotation of the substrate.

Akiyama et al shows a method of making an optical disk with a small warping angle of 4.1 mrad (Table 1).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to find the a disk plane tilting substantially with respect to a plane perpendicular to an axis of rotation of the substrate in Sandstrom et al's device. The rationale is as follows: it is well known in the art that every disk would have certain warping angle. Akiyama teaches a method for making small wrapping angle

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thus making the disk small in distortion (PROBLEM TO SOLVE SECTION, lines 1-4 in English translation). One of ordinary skill in the art would have been motivated to use this method to obtain a disk with small warping angle. As this disk is used in Abiko's device, a disk plane would have been tilting substantially with respect to a plane perpendicular to an axis of rotation of the substrate.

With regard to claim 69/67, Sandstrom shows a disk with an inherent tilt angle, which is not specified, Akiyama et al shows an improved disk substrate, which has a tilt angle of 4.1 mrad. Applicant recites an angle in a range between 10 and 20 mrad without specific reason for differential from the range of 1 to 20 mrad. One of ordinary skill in the art would have been find a reasonable angle through experimentations, which would include a range between 10 and 20 mrad.

With regard to claim 70, the above includes a cylindrical receptacle formed in the center thereof for holding the hub, the receptacle having a hole formed through the bottom thereof coaxially with the axis of rotation.

With regard to claim 72, Akiyama shows that the disk substrate has a thickness between 0.1 and 0.7 mm.

11. Claims 63 and 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Sumi et al (US 6,243,326).

With regard to claims 63, and 78, Suzuki's device includes an axis of rotation and a disk plane substantially tilting with respect to a plane perpendicular to the axis of rotation; the record disk has an axis of rotation, and a disk plane tilting at a tilt angle with a plane perpendicular to the axis of rotation, the tilt angle θ varies from Fig.

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5A to 5B, which must have a point, at this point the tilt angle θ satisfies the relationship of $1 \text{ mrad} \leq \theta \leq 20 \text{ mrad}$.

Suzuki is silent on the thickness of the disc.

Sumi et al shows a magneto-optical disk with high recording capacity of 12Gb having a thickness of 0.6 mm (Column 24, lines 35-36).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to apply Sumi et al's disk into Suzuki's device. The rationale is as follows: Suzuki's device uses a magneto-optical disk (Column 3, lines 25-26). Sumi et al shows a magneto-optical disk with high recording capacity having a thickness of 0.6 mm. One of ordinary skill in the art would have been motivated to use this Sumi et al's disk in Suzuki's device to obtain high recording capacity, which has a thickness of 0.6 mm, which is less than 0.8 mm.

12. Claim 87 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Sandstrom et al (US 6,154,441).

With regard to claim 87, Suzuki shows a magnet, but fails to show it is an electromagnet.

Sandstrom et al Shows that the magnet is electromagnet (Column 11, lines 64-66).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include an electromagnet as an alternative. The rationale is as follows: Sandstrom et al shows the magnet can be an electromagnet, and electromagnet is also widely used in the art. One of ordinary skill in the art would have been motivated to include the electromagnet as an alternative.

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13. Claims 71 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandstrom in view of Akiyama et al as applied to claim 61 above, and further in view of Abiko.

With regard to claim and 71, Sandstrom et al does not show that the hub is held movably in the cylindrical receptacle.

Abiko shows an optical disk, wherein does not show that the hub 7 is held movably in the cylindrical receptacle.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to use the movable hub taught by Abiko in Sandstrom et al's device. The rationale is as follows: Abiko teaches that installing a movable hub would avoid swaging processing and to greatly improve the reliability of a recording disk (PURPOSE section in English translation). One of ordinary skill in the art would have been motivated to use the movable hub thus improving reliability of the recording disk.

With regard to claim 73, Abiko shows that a relationship of $Y/X \geq 0.015$ is satisfied, where X and Y respectively denote the projected area of the substrate and the contact area between the hub and the substrate.

14. Claim 74 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sandstrom in view of Akiyama et al as applied to claim 68 above, and further in view of Nakani.

In Sandstrom et al , Akiyama et al, and Nakani's combination, the hub would have an outer diameter that is 26 or more % of the outer diameter of the substrate for the reasons described above.

Allowable Subject Matter

15. Claims 88-94 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

- With regard to claim 88, none of the prior art in the record discloses a driving apparatus for recording and reproducing information by radiating light onto the recording surface of a record disk including a light source for irradiating the record disk with light; a tilt sensor for measuring a tilt angle of the recording surface of the record disk relative to the optical axis of the light incident on the disk; a rotating shaft for rotating the record disk; an electromagnet embedded in the rotating shaft; and a controller for controlling the magnetic field intensity of the electromagnet based on the tilt angle detected by the tilt sensor, and for adjusting the force with which the hub presses the disk plane of the record disk.
- Applicant asserts that by using this arrangement, while the disk is rotated, its recording surface is kept horizontal (Spec. p. 66, lines 18-19).

Allowable Subject Matter

16. Claims 88-94 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

- With regard to claim 88, none of the prior art in the record discloses a driving apparatus for recording and reproducing information by radiating light onto the recording surface of a record disk including a light source

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for irradiating the record disk with light; a tilt sensor for measuring a tilt angle of the recording surface of the record disk relative to the optical axis of the light incident on the disk; a rotating shaft for rotating the record disk; an electromagnet embedded in the rotating shaft; and a controller for controlling the magnetic field intensity of the electromagnet based on the tilt angle detected by the tilt sensor, and for adjusting the force with which the hub presses the disk plane of the record disk.

- Applicant asserts that by using this arrangement, while the disk is rotated, its recording surface is kept horizontal (Spec. p. 66, lines 18-19).

Response to Arguments

17. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tianjie Chen whose telephone number is (703) 305-7499. The examiner can normally be reached on 8:00-4:30, Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chen Tianjie
TIANJIE CHEN
PRIMARY EXAMINER 106/17/04